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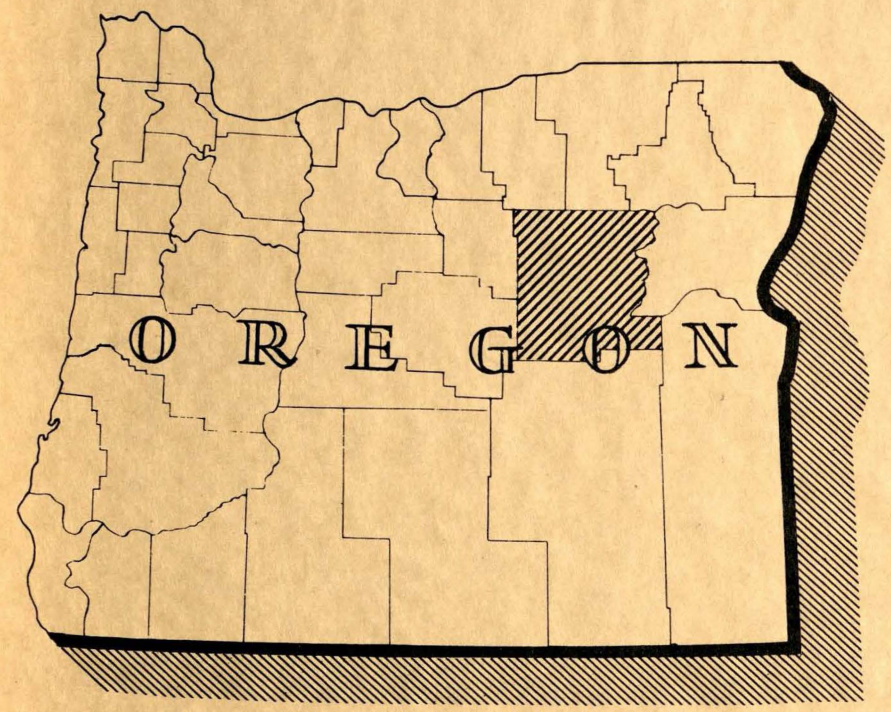
FOREST SURVEY REPORT 137
NOVEMBER 1960

FOREST STATISTICS *for* GRANT COUNTY, OREGON



PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION
U. S. DEPT. OF AGRICULTURE • FOREST SERVICE

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Forest Survey Report 137

FOREST STATISTICS

FOR

GRANT COUNTY, OREGON

by

Don Minore

November 1960

PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION
R. W. Cowlin, Director Portland, Oregon

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

PREFACE

This publication summarizes the results of a 1958 reinventory of the forests of Grant County, Oreg. The reinventory is a part of the maintenance phase of the Forest Survey, a nationwide project of the Forest Service authorized by the McSweeney-McNary Forest Research Act of 1928, amended June 25, 1949. The purpose of the Forest Survey is to periodically inventory the extent and condition of forest lands and the timber and other products on them, to ascertain rates of forest growth and depletion, to estimate present consumption of timber products and determine probable future trends in timber requirements, to analyze and make available survey information needed in the formulation of forest policies and programs, and to make resurveys as necessary to keep the basic information up to date.

The Forest Survey is conducted in the various forest regions of the Nation by the regional experiment stations of the Forest Service. In the Pacific Northwest region of Oregon and Washington, it is an activity of the Pacific Northwest Forest and Range Experiment Station at Portland, Oreg.

The initial inventory of forest lands in Grant County took place in 1935 and 1936. A statistical report, "Forest Statistics for Grant County, Oregon," and a forest type map on a 1-inch-to-the-mile scale were released in 1937.

Following the reinventory in 1958, the forest type map was revised and is available on scales of 1 and 2 inches to the mile. A single 1-inch-scale map was prepared for the county; the 2-inch-scale map was prepared in sections (see index map, inside rear cover). These maps may be obtained at cost of blueprinting. For information write Director, Pacific Northwest Forest and Range Experiment Station, P. O. Box 4059, Portland 8, Oreg.

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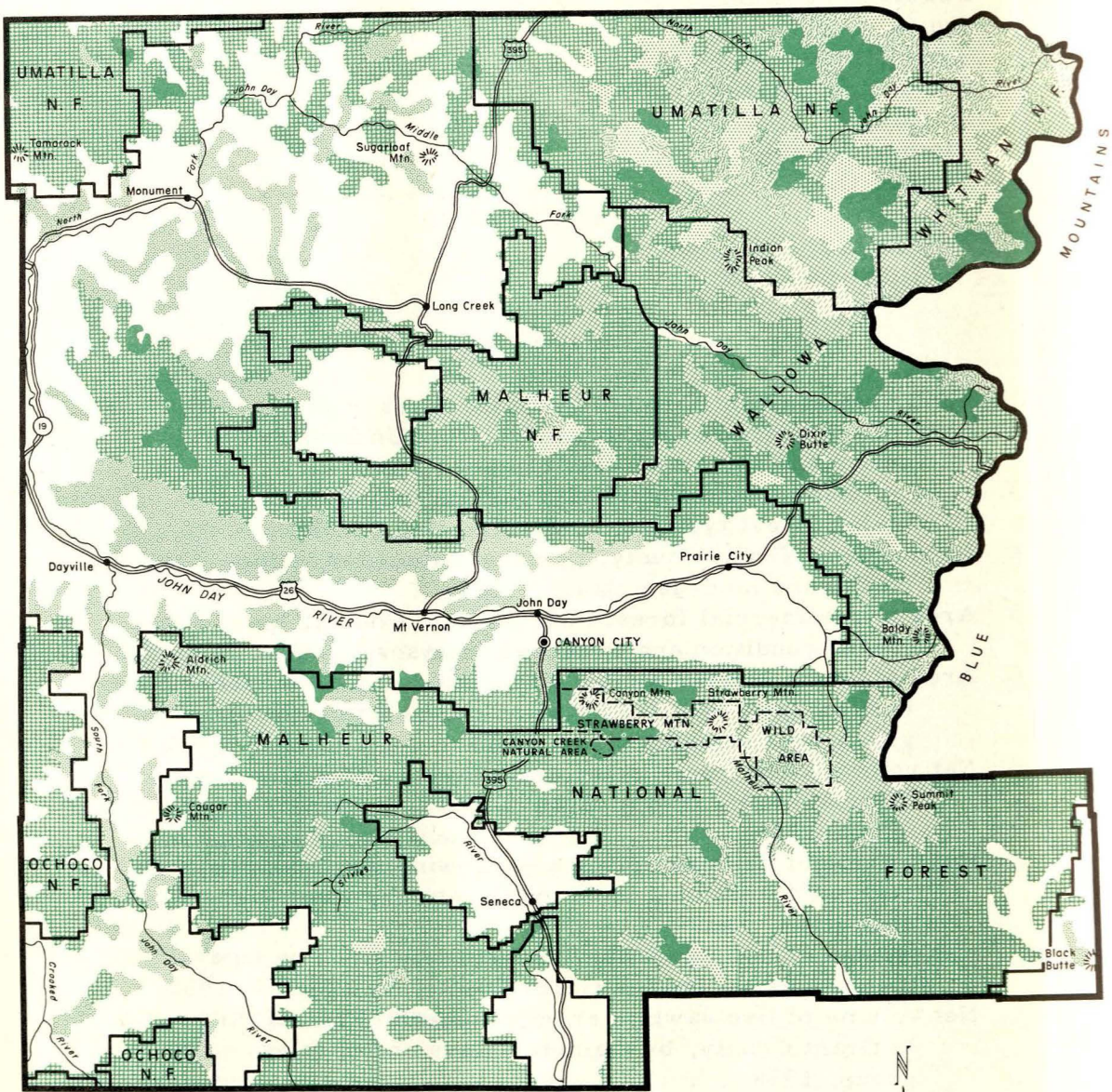
GENERALIZED FOREST TYPE MAP

GRANT COUNTY, OREGON

1958



DESCRIPTION OF THE COUNTY

Grant County is located on the western slopes of the Blue Mountains of northeastern Oregon. It is roughly rectangular in shape, extending approximately 65 miles west from the main range of the Blue Mountains and 72 miles north from the Harney County line.

The eastern part of Grant County is mountainous, with high, barren peaks and deep, timbered canyons. Toward the west, the topography moderates into uneven timbered ridges and open river bottoms. The southern extremity is part of a high, uneven plateau that extends across Harney County into the State of Nevada. Three spurs of the Blue Mountains traverse the county from east to west, separating the drainage basins of the four forks of the John Day River. These spurs--the Greenhorn, Dixie, and Strawberry ranges--vary in elevation from 5,000 to 9,600 feet. Several of their peaks extend above the upper limits of tree growth. Strawberry Mountain, located directly south of Prairie City, is the county's highest peak, with an elevation of 9,600 feet. The John Day River flows out of Grant County at the lowest point, approximately 1,800 feet above sea level.

The John Day River drains all of the region north of the Strawberry Range--about 80 percent of the total land area in Grant County. Southern parts of the county are drained by tributaries of the Malheur, Silvies, and Crooked Rivers.

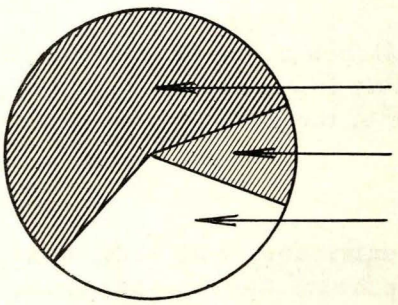
Climatic conditions within Grant County vary greatly. At Dayville, near the western boundary, the average annual precipitation is about 12 inches; while Olive Lake, in the northeast, receives more than 30 inches per year. The growing season ranges from 50 days a year at the higher elevations to 150 in the lower, more arid areas.

Federal Highways 26 and 395 divide the county into four nearly equal parts. The areas so formed are served by an extensive network of State and county roads. Approximately one-third of Grant County's estimated population of 7,584 lives in the county's three largest cities--John Day, Prairie City, and Canyon City.

SIGNIFICANT FINDINGS IN THE FOREST INVENTORY

Land Classification

Approximately two-thirds of the area of Grant County is forest land.



Class	M acres	Percent
Commercial forest	1,689.4	58
Noncommercial forest	307.2	11
Nonforest	896.3	31
Total	2,892.9	100

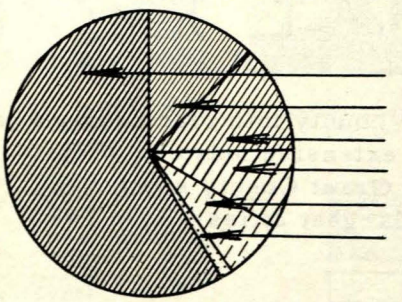
Three-fourths of the nonforest area in Grant County is farmland. Urban areas and rocky, nonvegetated land account for most of the remainder.

Eleven percent of the land area of Grant County is noncommercial forest land. Ninety-three percent of this area is unproductive; the rest is productive-reserved land, most of which falls within the Strawberry Mountain Wild Area. Canyon Creek Natural Area also contains productive-reserved land.

Commercial Forest Land Area

Major Types

The forests of Grant County are almost exclusively softwoods, with small stringers of hardwoods in the river valleys. A belt of western juniper separates the forest from the grassland. Ponderosa pine predominates over the forested area and often occurs in pure stands at lower elevations.

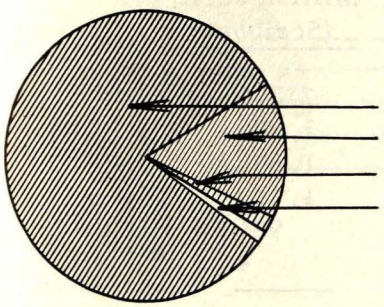


Type	M acres	Percent
Ponderosa pine	1,003.9	59
Fir-spruce	205.4	12
Douglas-fir	191.9	12
Lodgepole pine	149.5	9
Western larch	114.1	7
Others	24.6	1
Total	1,689.4	100

As elevation increases, other species are found in increasing proportions. These are Douglas-fir, white fir, western larch, lodgepole pine, and western white pine. On the cool, moist, upper slopes, fir and spruce predominate. Pure stands of lodgepole pine are often found at higher elevations where fire, insects, or disease killed the original stand.

Stand-Size Classes

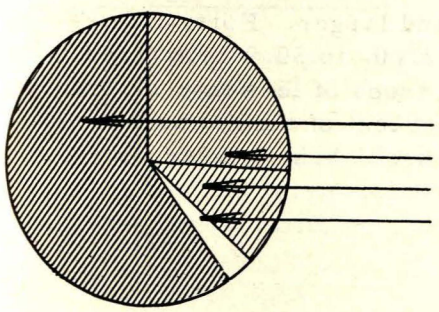
Grant County has 1,387,300 acres of its commercial forest area in sawtimber stands. Of this area 849,500 acres are occupied by stands classed as large sawtimber (21.0 inches d.b.h. and larger) and 537,800 acres are classed as small sawtimber (11.0-20.9 inches d.b.h.). There are 253,600 acres of poletimber, most of which has resulted from past cutting. However, a considerable area, especially in the lodgepole pine stands, has developed following fire. Seedling and sapling stands constitute 2 percent of the total commercial forest land of the county. Nonstocked areas, largely resulting from fire, make up 1 percent of the commercial forest area.



Stand Size	M acres	Percent
Sawtimber	1,387.3	82
Poletimber	253.6	15
Seedlings and saplings	27.4	2
Nonstocked	21.1	1
Total	1,689.4	100

Stocking of Young-Growth Stands

Most of the young-growth stands of Grant County are satisfactorily stocked (40-100 percent); only 14 percent are poorly stocked or nonstocked. (Young-growth stands are those in which the majority of the cubic-foot volume is in trees less than 21.0 inches d.b.h.) Ninety-two percent of the young-growth sawtimber, 81 percent of the poletimber, and 81 percent of the seedling and sapling areas are medium or well stocked.



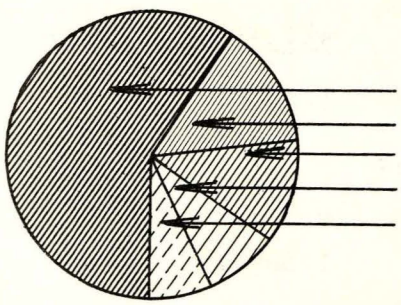
Stocking Class	M acres	Percent
Well	503.0	60
Medium	219.9	26
Poor	95.9	11
Nonstocked	21.1	3
Total	839.9	100

Commercial Forest Land Timber Volumes

The net volume of live, sound sawtimber trees (11.0 inches d.b.h. and larger) on commercial forest land in Grant County is estimated to be 13,549 million board feet, Scribner rule. Nearly all of this volume is in sawtimber stands. Only 1 percent occurs as sawtimber-size trees in other stand-size classes--poletimber, seedling and sapling stands, and nonstocked areas.

Volume of Sawtimber by Species

More than 99 percent of the live sawtimber volume in Grant County is in softwoods. Ponderosa pine accounts for 59 percent of the total sawtimber volume. An additional 34 percent is in three other species: Douglas-fir, white fir, and western larch. The remaining 7 percent is distributed among Engelmann spruce, lodgepole pine, subalpine fir, western white pine, mountain hemlock, black cottonwood, and quaking aspen.

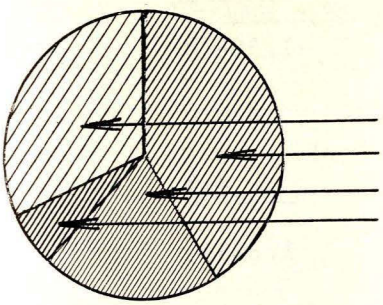


Species	Million bd.ft. (Scribner)	Percent
Ponderosa pine	7,898	59
Douglas-fir	1,906	14
White fir	1,641	12
Western larch	1,119	8
Other softwoods	981	7
Hardwoods	4	(1/)
Total	13,549	100

1/ Less than 0.5 percent.

Volume of Sawtimber by Diameter Classes

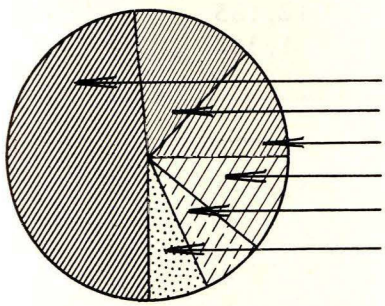
In Grant County, three-fourths of the sawtimber volume occurs in trees smaller than 31.0 inches d.b.h. Almost half the volume of ponderosa pine is in trees 21.0 to 30.9 inches d.b.h. Of the remaining pine volume, most is in trees 31.0 inches d.b.h. and larger. Forty-five percent of the Douglas-fir volume also occurs in 21.0- to 30.9-inch trees. The other Grant County species are predominantly trees of less than 21.0 inches d.b.h. Considering all species, less than 5 percent of the sawtimber volume in Grant County is found in trees 41.0 inches d.b.h. and larger.



Diameter class	Million bd. ft. (Scribner)	Percent
11.0 - 20.9	4,324	32
21.0 - 30.9	5,637	41
31.0 - 40.9	2,959	22
41.0+	629	5
Total	13,549	100

Volume of Growing Stock by Species

Growing stock volume includes all live, sound trees 5.0 inches d.b.h. and larger to a minimum 4-inch top inside bark. Almost half of the growing stock in Grant County is ponderosa pine.



Species	Million cu. ft.	Percent
Ponderosa pine	1,664	48
White fir	476	14
Douglas-fir	448	13
Lodgepole pine	392	11
Western larch	236	7
Other softwoods	229	7
Hardwoods	4	(1/)
Total	3,449	100

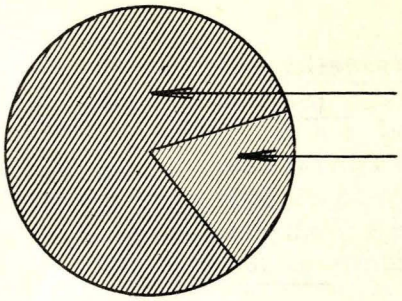
1/ Less than 0.5 percent.

Of the total growing stock, 80 percent is in sawtimber trees and 20 percent in poletimber.

Forest Ownership

Commercial Forest Land

Eighty-one percent of the commercial forest area in Grant County is federally owned, all but 3 percent of which is in the Malheur, Umatilla, and Wallowa-Whitman National Forests. Practically all the other Federal lands are administered by the Bureau of Land Management. Almost all of the commercial forest land not administered by the Federal government is privately owned; county, State, and municipal ownership is negligible.

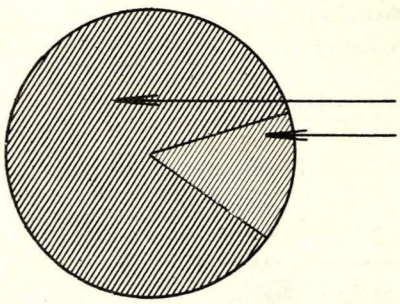


Ownership class	M acres	Percent
Federal	1,366.8	81
Private	320.0	19
Other public	2.6	(1/)
Total	1,689.4	100

1/ Less than 0.5 percent.

Sawtimber Volume

Ninety percent of the total sawtimber volume is federally owned. Almost all of the remaining volume is on private land.



Ownership	Million bd. ft. (Scribner)	Percent
Federal	12,185	90
Private	1,352	10
State	12	(1/)
Other public	--	(1/)
Total	13,549	100

1/ Less than 0.5 percent.

Log Production

In 1958, total log production in Grant County was 240 million board feet, Scribner rule. During the past 10 years, log output has averaged 225 million board feet annually, ranging from 154 million in 1949 to 285 million in 1956.

Privately owned forest land in Grant County produced more than half the county's log production during the 1949-1958 period.

	Annual production 1/ (M b.m.)
1949	154,338
1950	183,896
1951	214,769
1952	232,607
1953	199,049
1954	244,560
1955	281,748
1956	284,870
1957	211,136
1958	240,315

1/ Does not include volume removed for poles, piling, or products from woodcutting operations.

Table 1.--Land area in Grant County, by major class of land, 1958

(In thousands of acres)

Class of land	Area
Forest:	
Commercial	1,689.4
Noncommercial:	
Productive-reserved	20.0
Unproductive	287.2
Total forest	1,996.6
Nonforest	896.3
All classes	2,892.9

Table 2.--Area of commercial forest land in Grant County, by ownership and stand-size classes, 1958

(In thousands of acres)

Ownership class	Total	Sawtimber stands	Poletimber stands	Seedling and sapling stands	Nonstocked areas
Private	320.0	222.8	83.1	6.8	7.3
State	2.5	1.6	.7	(1/)	.2
County	.1	(1/)	.1	(1/)	--
Municipal	(1/)	(1/)	--	--	--
Federal:					
Bureau of Land Mgt.	43.0	37.6	4.8	.3	.3
National forest	1,323.8	1,125.3	164.9	20.3	13.3
Total Federal	1,366.8	1,162.9	169.7	20.6	13.6
All ownerships	1,689.4	1,387.3	253.6	27.4	21.1

1/ Less than 0.05.

Table 3.--Area of commercial forest land in Grant County, by major forest type and stand-size class, 1958

(In thousands of acres)

Forest type	Total	Sawtimber stands		Poletimber stands	Seedling and sapling stands	Nonstocked areas
		Large[1/]	Small[2/]			
Ponderosa pine	1,003.9	607.3	255.0	132.7	8.9	--
Western white pine	1.3	--	.7	.6	--	--
Lodgepole pine	149.5	--	49.7	84.2	15.6	--
Douglas-fir	191.9	96.6	73.1	20.9	1.3	--
Western larch	114.1	46.3	65.8	1.9	.1	--
Fir—spruce	205.4	99.2	92.7	12.0	1.5	--
Hardwood	2.2	.1	.8	1.3	--	--
Nonstocked	21.1	--	--	--	--	21.1
Total	1,689.4	849.5	537.8	253.6	27.4	21.1

[1/] 21.0 inches d.b.h. and larger.

[2/] 11.0-20.9 inches d.b.h.

Table 4.--Land area in Grant County, by cover

(In thousands

	Cover type or land use	Total unreserved and reserved
		PRODUCTIVE
		Total
1	Ponderosa pine, large sawtimber	610.7
2	Ponderosa pine, small sawtimber	255.2
3	Ponderosa pine, poletimber	132.7
4	Ponderosa pine, seedlings and saplings	8.9
5	White pine,[2] small sawtimber	.7
6	White pine, poletimber	.6
7	Lodgepole pine, small sawtimber	51.0
8	Lodgepole pine, poletimber	86.7
9	Lodgepole pine, seedlings and saplings	15.9
10	Douglas-fir, small old-growth and large young-growth sawtimber (red fir)	98.3
11	Douglas-fir, small sawtimber	74.2
12	Douglas-fir, poletimber	21.3
13	Douglas-fir, seedlings and saplings	1.3
14	Western larch, large sawtimber	47.2
15	Western larch, small sawtimber	66.9
16	Western larch, poletimber	2.2
17	Western larch, seedlings and saplings	.1
18	White fir,[3] large sawtimber	93.1
19	White fir, small sawtimber	57.3
20	White fir, poletimber	7.8
21	White fir, seedlings and saplings	1.4
22	True fir—mountain hemlock, large sawtimber	.9
23	True fir—mountain hemlock, small sawtimber	16.3
24	True fir—mountain hemlock, poletimber	4.7
25	True fir—mountain hemlock, seedlings and saplings	.2
26	Engelmann spruce, large sawtimber	7.9
27	Engelmann spruce, small sawtimber	22.0
28	Engelmann spruce, poletimber	.6
29	Hardwoods, large sawtimber	.1
30	Hardwoods, small sawtimber	.8
31	Hardwoods, poletimber	1.3
32	Nonstocked area	21.1
33	Total	1,709.4
		NONCOMMERCIAL
34	Subalpine	19.2
35	Noncommercial, rocky	17.6
36	Juniper	250.4
37	Total	287.2
		NONFOREST
38	Vegetative land (cultivated, grass, or brush)	880.2
39	Nonvegetative land (including barrens and cities)	15.1
40	Unmeandered water	1.0
41	Total	896.3
		ALL
	Forest land:	
42	Commercial	1,689.4
43	Noncommercial (productive-reserved and unproductive)	307.2
44	Total forest land	1,996.6
45	Nonforest land	896.3
46	Total, all land	2,892.9

[1] Less than 0.05.

[2] The white pine cover type, as specified by the Forest Survey in the Pacific Northwest, may be Pinus monticola (western white pine), Pinus albicaulis (whitebark pine), or both.

[3] See list of tree species, page 29.

type, ownership class, and land-use class, 1958

of acres)

Total	Private	State	County	Municipal	Federal: Bureau of Land Mgt.	Federal: Bureau of Reclamation	Federal: National forest	Reserved: Total	Reserved: State	Reserved: Federal (national forest)	
		Unreserved									
								Noncommercial (productive-reserved)			
FOREST LAND											
				Commercial							
607.3	98.0	1.1	--	--	26.6	--	481.6	3.4	--	3.4	1
255.0	86.0	.3	--	(1/)	7.1	--	161.6	.2	--	.2	2
132.7	63.5	.5	--	--	3.7	--	65.0	(1/)	--	(1/)	3
8.9	5.5	(1/)	--	--	.3	--	3.1	--	--	--	4
.7	--	--	--	--	--	--	.7	--	--	--	5
.6	--	--	--	--	--	--	.6	--	--	--	6
49.7	.5	--	--	--	--	--	49.2	1.3	--	1.3	7
84.2	5.4	--	0.1	--	.2	--	78.5	2.5	--	2.5	8
15.6	.5	--	(1/)	--	--	--	15.1	.3	--	.3	9
96.6	3.4	(1/)	--	--	.4	--	92.8	1.7	--	1.7	10
73.1	14.2	(1/)	--	--	2.7	--	56.2	1.1	--	1.1	11
20.9	11.5	.1	--	--	.8	--	8.5	.4	--	.4	12
1.3	.6	--	--	--	(1/)	--	.7	--	--	--	13
46.3	1.3	--	(1/)	--	.1	--	44.9	.9	--	.9	14
65.8	3.0	--	--	--	(1/)	--	62.8	1.1	--	1.1	15
1.9	--	--	--	--	(1/)	--	1.9	.3	--	.3	16
.1	.1	--	--	--	(1/)	--	--	(1/)	--	(1/)	17
90.6	7.5	--	--	--	.4	--	82.7	2.5	--	2.5	18
56.0	7.0	.2	--	--	.3	--	48.5	1.3	--	1.3	19
7.7	1.8	.1	--	--	.1	--	5.7	.1	--	.1	20
1.4	(1/)	--	--	--	--	--	1.4	--	--	--	21
.9	(1/)	--	--	--	--	--	.9	--	--	--	22
14.8	.9	--	--	--	--	--	13.9	1.5	--	1.5	23
3.7	.8	--	--	--	--	--	2.9	1.0	--	1.0	24
.1	.1	--	--	--	--	--	--	.1	--	.1	25
7.7	(1/)	--	--	--	--	--	7.7	.2	--	.2	26
21.9	.1	--	--	--	--	--	21.8	.1	--	.1	27
.6	--	--	--	--	--	--	.6	--	--	--	28
.1	.1	--	--	--	--	--	--	--	--	--	29
.8	.8	--	--	--	(1/)	--	---	--	--	--	30
1.3	.1	--	--	--	--	--	1.2	--	--	--	31
21.1	7.3	.2	--	--	.3	--	13.3	--	--	--	32
1,689.4	320.0	2.5	.1	(1/)	43.0	--	1,323.8	20.0	--	20.0	33
UNPRODUCTIVE FOREST LAND											
12.8	0.8	--	--	--	--	--	12.0	6.4	--	6.4	34
10.3	1.9	--	--	--	1.5	--	6.9	7.3	--	7.3	35
250.1	154.1	1.0	--	--	35.1	--	59.9	.3	0.3	(1/)	36
273.2	156.8	1.0	--	--	36.6	--	78.8	14.0	.3	13.7	37
LAND											
876.5	668.5	2.3	0.1	0.1	90.8	0.3	114.4	3.7	1.9	1.8	38
11.9	5.8	.2	--	(1/)	1.7	(1/)	4.2	3.2	1.0	2.2	39
.9	.3	(1/)	--	--	(1/)	--	.6	.1	--	.1	40
889.3	674.6	2.5	.1	.1	92.5	.3	119.2	7.0	2.9	4.1	41
LAND											
1,689.4	320.0	2.5	0.1	(1/)	43.0	--	1,323.8	--	--	--	42
273.2	156.8	1.0	--	--	36.6	--	78.8	34.0	0.3	33.7	43
1,962.6	476.8	3.5	.1	(1/)	79.6	--	1,402.6	34.0	.3	33.7	44
889.3	674.6	2.5	.1	0.1	92.5	0.3	119.2	7.0	2.9	4.1	45
2,851.9	1,151.4	6.0	.2	.1	172.1	.3	1,521.8	41.0	3.2	37.8	46

Table 5.--Area of commercial forest land in Grant County, by forest-condition and ownership classes, 1958

(In thousands of acres)

Forest-condition class	Total	Private	State	County	Municipal	Federal	
						Bureau of Land Mgt.	National forest
Softwoods:							
Large sawtimber:							
Uncut	584.2	67.9	1.0	(1/)	--	19.6	495.7
Residual	265.2	42.3	.1	--	--	7.9	214.9
Total	849.4	110.2	1.1	(1/)	--	27.5	710.6
Small sawtimber:							
Uncut	355.2	30.1	.1	--	(1/)	5.1	319.9
Residual	181.8	81.6	.4	--	--	5.0	94.8
Total	537.0	111.7	.5	--	(1/)	10.1	414.7
Poletimber	252.3	83.0	.7	.1	--	4.8	163.7
Seedlings and saplings	27.4	6.8	(1/)	(1/)	--	.3	20.3
Hardwoods	2.2	1.0	--	--	--	(1/)	1.2
Nonstocked	21.1	7.3	.2	--	--	.3	13.3
Total	1,689.4	320.0	2.5	.1	(1/)	43.0	1,323.8

1/ Less than 0.05.

Table 6.--Area of young-growth timber stands on commercial forest land in Grant County, by stand-size class, species group, and stocking class, 1958[1/]

(In thousands of acres)

Stand-size class and species group	Total	Well stocked	Medium stocked	Poorly stocked
Young-growth sawtimber:				
Softwoods	537.0	346.4	147.7	42.9
Hardwoods	.8	--	.4	.4
Total	537.8	346.4	148.1	43.3
Poletimber:				
Softwoods	252.3	137.7	67.1	47.5
Hardwoods	1.3	.7	.6	(2/)
Total	253.6	138.4	67.7	47.5
Seedlings and saplings:				
Softwoods	27.4	18.2	4.1	5.1
Hardwoods	--	--	---	--
Total	27.4	18.2	4.1	5.1
All classes:				
Softwoods	816.7	502.3	218.9	95.5
Hardwoods	2.1	.7	1.0	.4
Total	818.8	503.0	219.9	95.9

1/ Young-growth stands are those in which the majority of the cubic-foot volume is in trees less than 21.0 inches d.b.h.

2/ Less than 0.05.

Table 7.--Net volume of live sawtimber and growing stock on commercial forest land in Grant County, by ownership class, 1958

Ownership class	Live sawtimber volume		Growing stock volume
	Scribner rule	International 1/4-inch rule	
	Million bd.ft.	Million bd.ft.	Million cu.ft.
Private	1,352	1,488	419
State	12	13	4
County	(1/)	(1/)	(1/)
Municipal	(1/)	(1/)	(1/)
Federal:			
Bureau of Land Mgt.	250	274	71
National forest	11,935	13,058	2,955
Total Federal	12,185	13,332	3,026
All ownerships	13,549	14,833	3,449

1/ Less than 0.5.

Table 8.--Net volume of live sawtimber and growing stock on commercial forest land in Grant County, by stand-size class, 1958

Stand-size class	Live sawtimber volume		Growing stock volume
	Scribner rule	International 1/4-inch rule	
	Million bd.ft.	Million bd.ft.	Million cu.ft.
Sawtimber stands	13,374	14,638	3,209
Poletimber stands	168	187	237
Seedling and sapling stands	2	3	1
Nonstocked areas	5	5	2
Total	13,549	14,833	3,449

Table 9.--Net volume of live sawtimber and growing stock on commercial forest land in Grant County, by species, 1958

Species	Live sawtimber volume		Growing stock volume
	Scribner rule	International 1/4-inch rule	
	Million bd.ft.	Million bd.ft.	Million cu.ft.
Softwoods:			
Ponderosa pine	7,898	8,591	1,664
Douglas-fir	1,906	2,109	448
White fir	1,641	1,772	476
Western larch	1,119	1,245	236
Engelmann spruce	448	507	133
Lodgepole pine	338	395	392
Subalpine fir	170	183	90
Western white pine	24	26	6
Mountain hemlock	1	1	(1/)
Total	13,545	14,829	3,445
Hardwoods:			
Quaking aspen	2	2	3
Black cottonwood	2	2	(1/)
Red alder	--	--	(1/)
Other hardwoods	--	--	1
Total	4	4	4
All species	13,549	14,833	3,449

1/ Less than 0.5.

Table 10.--Net volume of live sawtimber on commercial forest land in Grant County, by diameter class and species group, 1958

(In million board feet)

Diameter class (inches d.b.h.) and log rule	Total	Ponderosa pine	Douglas-fir	Western larch	White fir	Engelmann spruce	Lodgepole pine	Other
11.0-20.9:								
Scribner rule	4,324	1,570	718	522	748	284	326	156
International 1/4-inch rule	4,946	1,821	833	605	807	330	381	169
21.0-30.9:								
Scribner rule	5,637	3,587	861	392	610	139	12	36
International 1/4-inch rule	6,089	3,874	930	424	659	150	14	38
31.0-40.9:								
Scribner rule	2,959	2,226	275	174	252	25	(1/)	7
International 1/4-inch rule	3,142	2,360	292	184	272	27	(1/)	7
41.0 and larger:								
Scribner rule	629	515	52	31	31	--	--	--
International 1/4-inch rule	656	536	54	32	34	--	--	--
All diameter classes:								
Scribner rule	13,549	7,898	1,906	1,119	1,641	448	338	199
International 1/4-inch rule	14,833	8,591	2,109	1,245	1,772	507	395	214

1/ Less than 0.5.

Table 11.--Net volume of all timber on commercial forest land in Grant County, by class of material and species group, 1958

(In million cubic feet)

Class of material	Total	Softwoods	Hardwoods
Growing stock:			
Sawtimber trees:			
Saw-log portion	2,573	2,572	1
Upper-stem portion	194	194	(1/)
Total	2,767	2,766	1
Poletimber trees	682	679	3
Total growing stock	3,449	3,445	4
Other material:			
Sound cull trees	13	10	3
Rotten cull trees	12	12	(1/)
Salvable dead trees	21	21	(1/)
Total other material	46	43	3
All timber	3,495	3,488	7

1/ Less than 0.5.

Table 12.--Average annual cut of live sawtimber and growing stock on commercial forest land in Grant County, by species group, 1954-58

Species group[1]	Live sawtimber						Growing stock		
	Scribner rule			International 1/4-inch rule					
	Annual cut[2]	Timber products	Logging residue	Annual cut[2]	Timber products	Logging residue	Annual cut[2]	Timber products	Logging residue
	Thousand board feet						Thousand cubic feet		
Softwoods	245,455	252,526	2,576	268,716	276,457	2,820	50,737	47,956	2,033

[1] Hardwood cut insignificant.

[2] Annual cut is the reduction in inventory volume resulting from the production of the given output of timber products.

FOREST SURVEY PROCEDURE

Procedures used in the reinventory of Grant County were materially different from those used in the initial inventory. This change in procedures accounts for some significant differences in the forest-area and timber-volume statistics obtained.

Initial Inventory

The initial inventory of the county's forests was conducted in 1935 and 1936 by what is known as the compilation method. In this method, existing information on forest types, timber volumes, areas logged, and other inventory data were collected from private timber owners and various public agencies. These data were checked in the field for reliability and were adjusted to Forest Survey specifications and standards. Forest-type and timber-volume data for areas not covered by reliable existing information were obtained through field reconnaissance. Timber-volume estimates for immature stands were determined from normal yield tables adjusted for site, age, and density of stand.

All land in the county was classified as either forest or nonforest. Forest land was further classified as commercial or noncommercial; the commercial was still further classified by forest type, stand-size or condition class, and--in young-growth stands--by stocking and age classes. All such types and classes were mapped in place on a 1-inch-to-the-mile base map of each forested township. Next, these township type maps were superimposed over current ownership-status plats and dot counted to obtain forest-type area statistics by ownership class. Type delineations on the township maps were then transferred to a base map of the county to form a county forest type map. The commercial forest land was also classified as to site quality, or forest productive capacity.

In-place, timber-volume estimates were based on (1) existing cruises collected and adjusted to the Forest Survey standard, (2) field samples, and (3) ocular appraisals. Cruises made by commercial cruisers were obtained for most of the privately owned timber, and Forest Service cruises were available for a large part of the national-forest lands. Separate volume estimates were computed for each of the commercial tree species and for each ownership class. Methods used in this initial inventory did not permit a statistical computation of accuracy of the estimate.

Reinventory

The reinventory of Grant County was a cooperative project involving both national-forest and Forest Survey personnel. The Elkhorn and Middle Fork Working Circle inventories were completed in 1956 by national-forest inventory crews. Other working circles (Burns, Crooked River, John Day, Morrow, and North Fork) were completed during the fall of 1958. Areas

outside the national forests were also inventoried in 1958, and the forest type map of Grant County was completely revised at that time.

The type map revision was accomplished through interpretation, classification, and field mapping on aerial photos that covered all the land area in the county. In the mapping on aerial photos, types where classification was difficult were examined more closely in the field. Likewise, species composition of mixed stands was checked on the ground. The use of aerial photos in mapping resulted in type delineations of much greater accuracy and detail than that obtained through the ground reconnaissance employed in the initial inventory. In the preparation of a revised type map, the delineations on the aerial photos were transferred to a 2-inch county base map through use of a reflecting projector.

Volume estimates for live sawtimber, growing stock, and salvable dead material were derived through a sampling procedure in which stands were measured on sample plots. Sample plots on the Middle Fork Working Circle were half-acre areas, 1/2 chain wide and 10 chains long. All other Grant County plots consisted of clusters of three 1/5-acre circular subplots spaced at 6-chain intervals. Intensity of sampling was designed to produce an estimate of total volume to a specified sampling accuracy set by Forest Survey.

For those areas outside the national forest, type areas were determined by a dot count on the forest type maps. The average per-acre volumes for sawtimber, poletimber, and seedling and sapling stands were obtained through a sampling procedure in which stands were sampled with a systematic grid of plots evenly distributed over the county. This was slightly modified in the Elkhorn Working Circle, where the plots were selected randomly. Volume estimates were calculated by applying average per-acre volumes to the appropriate forest type areas.

Land classification for the Burns, Crooked River, John Day, Morrow, and North Fork Working Circles was based on a systematic grid of plots. Each subplot was first classified as commercial forest, noncommercial forest, or nonforest. The ratio of subplots in each class to the total number of subplots was applied to the total land area to determine the acreage of each classification. Subplots falling on commercial forest land were also classified by forest type and stand-size class as indicated by the plot tally. The percentage of subplots falling in each type was applied to the total area of commercial forest land in the working circle to determine the acreage of land in that type. Land classification for the Middle Fork Working Circle was accomplished in a similar manner. The plots were systematically distributed with the help of aerial photos instead of a grid, however.

Volumes were determined in the following manner: For each working circle, an average volume per acre was determined by species for all subplots falling on commercial forest land. These volumes, expanded by

the total acreage of commercial forest land in each working circle, provided total volume by species for each working circle inventoried.

ACCURACY OF 1958 REINVENTORY DATA

Forest Area

In the Elkhorn Working Circle of the Wallowa-Whitman National Forests and in all land outside the national forests, acreages of forest type, stand-size class, and condition class were obtained from forest type maps of the county. Thus, no error due to sampling was involved in these areas. Errors due to techniques or judgment in the field were possible but difficult to evaluate. Throughout all phases of the work, however, close supervision and frequent checks assured a high level of accuracy and uniformity of standards.

The Crooked River, Burns, John Day, Middle Fork, Morrow, and North Fork Working Circles--administered by the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests--were sampled for area. The chances are 19 out of 20 that the actual total area of commercial forest land in these working circles is within plus or minus 2.3 percent of the estimated total of 1,250,400 acres, and that the noncommercial area is within plus or minus 17.2 percent of the estimated 76,000 acres.

Timber Volume

The chances are 19 out of 20 that the total board-foot volume of live sawtimber, if measured by a 100-percent cruise, would be within plus or minus 5.67 percent of the estimated total of 13,549 million board feet (Scribner rule) for Grant County. On the same basis, cubic-foot volume of growing stock from a 100-percent cruise would be within a range of plus or minus 5.1 percent of the estimated 3,449 million cubic feet.

DIFFERENCES IN RESULTS OF INVENTORIES

Some differences between the forest-type and timber-volume statistics resulting from the initial inventory and those resulting from the reinventory are due to physical change--such as cutting of stands, restocking of deforested areas, and ingrowth of stands into the next larger size class. Other differences are due to variations in the procedures used to interpret and classify forest conditions, and to variations in standards of utilization. Differences such as these preclude direct comparison of some of the statistics; comparison of other statistics is meaningful only after they have been adjusted to common standards.

Forest Area

Most of the increase in forest area shown in the 1958 reinventory is the product of the more intensive survey techniques used in classifying noncommercial unproductive land. The area occupied by juniper, a noncommercial forest type, increased from 49,000 acres in 1937 to 250,100 acres in 1958. Sawtimber area has decreased by 89,000 acres; while poletimber and seedling and sapling types show an increase of 92,000 acres. The nonstocked area increased from 6,000 to 21,000 acres in Grant County during the 1937-1958 period.

Table 13.--Comparison of forest area statistics for Grant County, initial inventory and reinventory

(Thousand acres)

Forest area	1937	1958
Sawtimber	1,476	1,403
Poletimber; seedlings and saplings	204	286
Nonstocked	6	21
Noncommercial unproductive	134	287
Total	1,820	1,997

Timber Volume

The 1958 reinventory of Grant County showed an increase in volume for all species except ponderosa pine. The volume of ponderosa pine sawtimber in Grant County decreased by approximately 20 percent during the period between inventories.

Table 14.--Comparison of timber volume statistics for Grant County, initial inventory and reinventory

(Million board feet, Scribner rule)

Species	1937	1958
Ponderosa pine	9,703	7,898
Douglas-fir	1,099	1,906
All other species	1,382	3,745
Total	12,184	13,549

DEFINITION OF TERMS

Land Area

Total Land Area

Includes dry land and unmeandered water surfaces.

Forest Land Area

Includes (a) land that is at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; and (b) land from which the trees described in "(a)" have been removed to less than 10-percent stocking and that has not been developed for other use. Minimum area of forest land recognized in reinventory of the counties is 10 acres.

Nonforest Land Area

Land that does not qualify as forest land. Minimum area recognized in the reinventory of the counties is 10 acres.

Forest Land Classes

Commercial Forest Land Area

Forest land that is (a) producing, or is physically capable of producing, usable crops of wood, (b) economically available now or prospectively, and (c) not withdrawn from timber utilization.

Noncommercial Forest Land Area

Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order but that otherwise qualifies as commercial forest land, or (b) incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Types

Forest Land Types

Forest land is typed on the basis of the predominant species, as indicated by cubic volume for sawtimber and poletimber stands and number of trees for seedling and sapling stands, or on the basis of forest condition, such as nonstocked cutover or burned-over land. Where none of the indicated species comprise 50 percent or more of a given stand, the stand is classified on the basis of plurality of cubic volume or number of trees. In classifying forest land by type, the minimum area recognized is 10 acres.

Commercial Forest Land

Major forest types. Local forest types are grouped into generalized types. The major forest types in Grant County are as follows:

Ponderosa pine. Forests in which 50 percent or more of the stand is ponderosa pine.

Lodgepole pine. Forests in which 50 percent or more of the stand is lodgepole pine.

Western white pine. Forests in which 50 percent or more of the stand is western white pine.

Douglas-fir. Forests in which 50 percent or more of the stand is Douglas-fir.

Western larch. Forests in which 50 percent or more of the stand is western larch.

Fir-spruce. Forests in which 50 percent or more of the stand is true fir, Engelmann spruce, or both.

Hardwoods. Forests in which 50 percent or more of the stand is black cottonwood or other hardwoods, singly or in combination.

Noncommercial Forest Land

Productive-reserved. Forest land withdrawn from timber utilization through statute, ordinance, or administrative order, but that otherwise qualifies as commercial forest land.

Unproductive. Forest land incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Nonforest Land Types

Vegetative. Cultivated land, stump pasture, grass, or brush on nonforest land.

Nonvegetative. Includes barrens and towns.

Unmeandered water. Includes unmeandered streams and lakes, and tideflats.

Tree Classes

Sawtimber Tree

Tree of commercial species, 11.0 inches d.b.h. and larger, that contains at least one 16-foot coniferous saw log or one 8-foot hardwood saw log to a variable top diameter never less than 8 inches inside the bark. Also, 25 percent or more of the gross board-foot volume must be free from rot or defect.

Poletimber Tree

Tree of commercial species, 5.0 to 10.9 inches d.b.h., in which 25 percent or more of the gross cubic-foot volume is free from rot and defect.

Seedling and Sapling Trees

Live trees of commercial species, less than 5.0 inches d.b.h., and of good form and vigor.

Cull Tree

Live tree of sawtimber or poletimber size that is unmerchantable for saw logs, now or prospectively, because of defect, rot, or species.

Sound cull tree. Live tree of sawtimber or poletimber size that contains 25 percent or more of sound volume but will not make at least one merchantable saw log, now or prospectively, because of roughness, poor form, or species.

Rotten cull tree. Live tree of sawtimber or poletimber size in which less than 25 percent of the total volume is sound.

Salvable Dead Tree

Standing or down dead tree that contains 25 percent or more of sound volume and at least one merchantable 16-foot coniferous or 8-foot hardwood saw log.

Stand-Size Classes

Sawtimber Stand

Stand of sawtimber trees having a minimum per-acre net volume of 1,500 board feet (International 1/4-inch rule).

Large sawtimber stand. Stand in which the majority of the volume is in trees 21.0 inches d.b.h. and larger.

Small sawtimber stand. Stand in which the majority of the volume is in trees from 11.0 to 20.9 inches d.b.h.

Uncut sawtimber stand. Sawtimber stand in which less than 10 percent of its volume has been removed by cutting.

Residual sawtimber stand. Sawtimber stand in which 10 percent or of the volume has been removed by cutting, and in which the residual per-acre volume amounts to at least 1,500 board feet (International 1/4-inch rule).

Poletimber Stand

Stand failing to meet sawtimber stand specifications but at least 10 percent stocked with poletimber and larger (5.0 inches d.b.h. and larger) trees and with at least half the minimum stocking in poletimber trees.

Seedling and Sapling Stand

Stand not qualifying as either a sawtimber or poletimber stand but at least 10 percent stocked with trees of commercial species and with at least half the minimum stocking in seedling and sapling trees.

Nonstocked Area

An area less than 10 percent stocked with present or potential growing-stock trees.

Stocking

Stocking is the extent to which growing space is effectively utilized by present or potential growing-stock trees of commercial species. "Degree of stocking" is synonymous with "percentage of growing space occupied" and means the ratio of actual stocking to full stocking for comparable sites and stands. Stocking may be measured in terms of number of trees, volume, basal area, cover canopy, or other criterion or combination of criteria.

Well-Stocked Stand

A stand that is 70 percent or more stocked with present or potential growing-stock trees.

Medium-Stocked Stand

A stand that is 40 to 69 percent stocked with present or potential growing-stock trees.

Poorly Stocked Stand

A stand that is 10 to 39 percent stocked with present or potential growing-stock trees.

Nonstocked Area

An area less than 10 percent stocked with present or potential growing-stock trees.

Timber Volume

Live Sawtimber Volume

Net volume in board feet of live sawtimber trees of commercial species:

Scribner rule. The common board-foot log rule used in determining volume of sawtimber in the Pacific Northwest.

International 1/4-inch rule. The standard board-foot log rule adopted nationally by the Forest Service in the presentation of Forest Survey volume statistics.

Growing Stock

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4.0-inch top (of central stem) inside bark.

All-Timber Volume

Net volume in cubic feet of live and salvable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species from stump to a minimum 4.0-inch top inside bark.

Timber Cut

Annual Cut of Live Sawtimber

The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from live sawtimber. The volume of timber products cut from live sawtimber.

Logging residues from live sawtimber. The volume of sound wood in live sawtimber trees cut or killed by logging on commercial forest land and not converted to timber products.

Annual Cut of Growing Stock

The net cubic-foot volume of live sawtimber and poletimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from growing stock. The volume of timber products cut from growing stock.

Logging residues from growing stock. The volume of sound wood in growing stock cut or killed by logging on commercial forest land and not converted to timber products.

TREE SPECIES

Tree species commonly found in Grant County include:

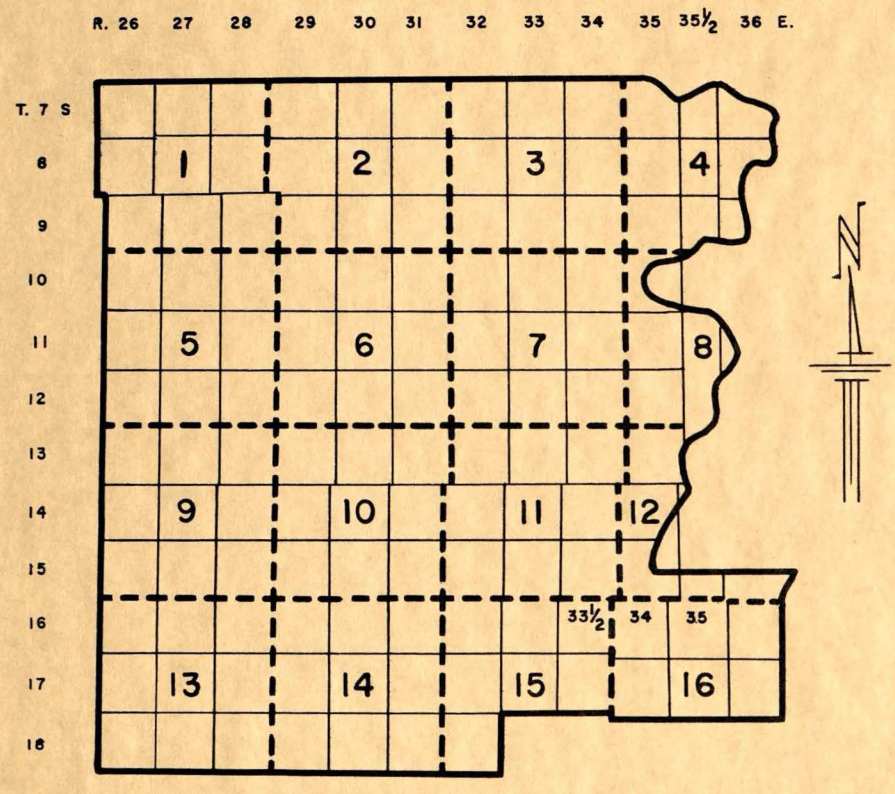
Softwoods:

Douglas-fir (Pseudotsuga menziesii)
Engelmann spruce (Picea engelmannii)
Lodgepole pine (Pinus contorta)
Mountain hemlock (Tsuga mertensiana)
Ponderosa pine (Pinus ponderosa)
Subalpine fir (Abies lasiocarpa)
Western juniper (Juniperus occidentalis)
Western larch (Larix occidentalis)
Western white pine (Pinus monticola)
White fir (Abies concolor or A. grandis)[1/]

Hardwoods:

Black cottonwood (Populus trichocarpa)
Quaking aspen (Populus tremuloides)
Red alder (Alnus rubra)

[1/] No attempt was made to separate A. concolor (white fir) from A. grandis (grand fir). White fir, as specified in the Forest Survey in the Pacific Northwest, may be concolor, grandis, or both.



INDEX MAP of

GRANT COUNTY

STATE of OREGON

showing divisions of 2" = 1 mile maps

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